CLAIMS

We claim:

1. An electrical mounting board comprising:

a substrate having a plurality layers configured such that a substrate core lies between the layers;

a first layer having formed thereon a plurality of bi-directionally oriented electrical ground traces arranged in a hybrid configuration so that a first group of electrical ground traces is arranged in a transverse relationship with a second group of electrical ground traces;

a second layer having formed thereon a plurality of bi-directionally oriented electrical ground traces arranged in a hybrid configuration so that a third group of electrical ground traces is arranged in a transverse relationship with a fourth group of electrical ground traces;

a set of electrically conductive interconnects that pass through the substrate core to electrically connect electrical ground traces of the first layer with electrical ground traces of the second layer to form a multi-layer ground grid having a plurality of ringlets; and

at least one of electrical contacts and signal traces formed between the electrical ground traces of at least one of the first and second layers.

2. An electronic device incorporating the board of Claim 1.

3. The board of Claim 1 wherein the electrical board comprises a two layer board wherein the first layer comprises a top layer of the board and wherein the second layer comprises a bottom layer of the board.

4. The board of Claim 1 wherein the electrical board comprises a board having at least three layers.

5. The board of Claim 1 wherein electronic components are mounted on the board and electrically connected with the at least one of electrical contacts and signal traces.

6. The board of Claim 5 wherein electrical signal is provided to an electronic component using a signal trace;

wherein the electronic component is electrically connected with an associated ringlet; and

wherein the signal trace is configured so that it is positioned near the associated ringlet.

7. The board of Claim 6 wherein an electrical current path defined by the signal trace and a return path trough an associated ringlet is configured to minimize the loop area defined by the electrical current path.

8. The board of Claim 1 wherein the plurality of electrical ground traces of the first layer overlay the plurality of electrical ground traces of the second layer to form a multi-layer grid having a plurality of ringlets configured such that the density of the ringlets is related to one of the anticipated or measured electromagnetic noise of circuitry and electrical components mounted on the board.

9. The board of Claim 1 wherein the ringlets are formed having different sizes at different areas of the board.

10. An electrical mounting board comprising:

a substrate having a plurality layers configured such that a substrate core lies between the layers;

a first layer having formed thereon a plurality of electrical ground traces configured in at least two groups arranged in a hybrid configuration so that a first

group of substantially parallel electrical ground traces is arranged in a transverse relationship with a second group of substantially parallel electrical ground traces;

a second layer having formed thereon a plurality of electrical ground traces configured in at least two groups arranged in a hybrid configuration so that a third group of substantially parallel electrical ground traces is arranged in a transverse relationship with a fourth group of substantially parallel electrical ground traces;

a set of electrically conductive interconnects that pass through the substrate core to electrically connect electrical ground traces of the first layer with electrical ground traces of the second layer to form a multi-layer ground grid having a plurality of ringlets; and

signal traces formed on at least one of the first and second layers.

11. An electronic device incorporating the board of Claim 10.

12. The electronic device of Claim 10 wherein the device comprises a computer.

13. The board of Claim 10 wherein the electrical board comprises a two layer board wherein the first layer comprises a top layer of the board and wherein the second layer comprises a bottom layer of the board.

14. The board of Claim 13 wherein electronic components are mounted on at least one of the first and second layers and electrically connected with the signal traces and electrically grounded to the ground traces of the board.

15. The board of Claim 14 wherein the ringlets are located adjacent to the signal traces that electrically connect to the electronic components.

16. The board of Claim 10 wherein the electrical board comprises a multi-layer board having at least three layers.

17. The board of Claim 10 wherein the plurality of electrical ground traces of the first layer overlay the plurality of electrical ground traces of the second layer to form a multi-layer ground grid having a plurality of ringlets configured in substantially square arrangements.

18. The board of Claim 10 wherein the plurality of electrical ground traces of the first layer overlay the plurality of electrical ground traces of the second layer to form a multi-layer ground grid having a plurality of ringlets configured in substantially diamond-shaped arrangements.

19. The board of Claim 10 wherein the plurality of electrical ground traces of the first layer overlay the plurality of electrical ground traces of the second layer to form a multi-layer ground grid having a plurality of ringlets configured in substantially triangular arrangements.

20. The board of Claim 10 wherein the plurality of electrical ground traces of the first layer overlay the plurality of electrical ground traces of the second layer to form a multi-layer ground grid having a plurality of ringlets configured such that the density of the ringlets is associated with the electrical components mounted with the board.

21. The board of Claim 10 wherein the signal traces are electrically connected with associated electronic components mounted on the board.

22. The board of Claim 21 wherein the hybrid configurations of electrical ground traces on the first layer and the second layer are arranged to accommodate the arrangement of the signal traces and the associated electronic components that are mounted on the board.

23. The board of Claim 22 wherein electronic components include electromagnetic field sensitive components whose mode of operation is sensitive to variations in electromagnetic fields and wherein said plurality of ringlets are positioned underneath the electromagnetic field sensitive components to reduce the effects of undesirable electromagnetic emission.

24. The board of Claim 23 wherein at least one of the electromagnetic field sensitive components comprises a track pad and wherein a plurality of the ringlets are positioned underneath the track pad.

25. The board of Claim 10 wherein the first layer is configured in at least three groups arranged in a hybrid configuration so that the first group and the second group include a further fifth group comprising a plurality of substantially parallel electrical ground traces, wherein the first, second, and fifth groups are arranged so that each of said groups is in a transverse relationship with any adjacent group on the same layer; and wherein the second layer is configured in at least three groups arranged in a hybrid configuration so that the third group and the fourth group include a further sixth group comprising a plurality of substantially parallel electrical ground traces, wherein the third, fourth, and sixth groups are arranged so that each of said groups is in a transverse relationship with any adjacent group on the same layer.

26. A method of configuring a circuit layout for an electrical mounting board, the method comprising:

providing a substrate having at least a first layer and a second layer separated by a substrate core layer;

forming a pattern of signal traces on the first layer;

forming a pattern of electronic component arrangements associated with the first layer;

forming a plurality of conductive electrical ground traces on the first layer of the substrate, the traces of the first layer being formed in at least two groups arranged in a hybrid configuration so that a first group of substantially parallel electrical ground traces is arranged in a transverse relationship with a second group of substantially parallel electrical ground traces, the lengths and positions of the ground traces being arranged to accommodate the pattern of signal traces formed on the first layer and arranged to accommodate the pattern of electronic component arrangements associated with the first layer;

forming a pattern of signal traces on the second layer;

forming a pattern of electronic component arrangements associated with the second layer;

forming a plurality of conductive electrical ground traces on the second layer of the substrate, the traces of the second layer being configured in at least two groups arranged in a hybrid configuration so that a third group of substantially parallel conductive electrical ground traces is arranged in a transverse relationship with a fourth group of substantially parallel conductive electrical ground traces, the lengths and positions of the ground traces being arranged to accommodate the pattern of signal traces formed on the second layer and arranged to accommodate the pattern of electronic component arrangements associated with the second layer; and

forming a set of electrically conductive interconnects that pass through the substrate core to electrically connect electrical ground traces of the first layer with electrical ground traces of the second layer to form a multi-layer ground grid having a plurality of ringlets.

27. The method of Claim 26 wherein the electrical board comprises a two-layer board wherein the first layer comprises a top layer of the substrate and wherein the second layer comprises a bottom layer of the substrate.

28. The method of Claim 26 wherein the electrical board comprises a multi-layer board having at least three layers.

29. The method of Claim 26 wherein the plurality of electrical ground traces of the first layer are formed over the plurality of electrical ground traces of the second layer to form a multi-layer ground grid having a plurality of ringlets configured so that the ringlets can be electrically connected with electronic components.

30. The method of Claim 26 wherein forming the set of electrically conductive interconnects comprises forming the interconnects by:

forming vias in the substrate core in the regions where the electrical ground traces of the first layer with electrical ground traces of the second layer;

filling vias with conducting materials thereby establishing electrical contact between the electrical ground traces of the first layer with electrical ground traces of the second layer to form a multi-layer ground grid having a plurality of ringlets.

31. The method of configuring a circuit layout of Claim 26 further including:

forming another substrate core on the first layer;

forming a touch pad on a surface of the another substrate core.